

# What is the effect of university education on chances to be self-employed in transitional countries?: Instrumental variable analysis of cross-sectional sample of 29 nations

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**Abstract** We used a high-quality cross-sectional data set that covers a diverse set of 29 transitional countries, to find the effect of education on probability of people being self-employed using standard probit models and instrumental variable bivariate probit that address endogeneity. Our findings suggest a negative effect of university education on the propensity of being self-employed. This finding remains the same for the single-stage model (i.e. standard probit) and the instrumental variable model (i.e. bivariate probit). We found strong endogeneity in the estimation of education effect on the propensity of being self-employed, ignoring which renders estimations biased. Regression models, which do not address endogeneity tend to underestimate the negative effect of the education on the probability of being self-employed in the countries of transition. Researchers should use alternative approaches to reduce endogeneity, such as instrumental variables and longitudinal analysis.

**Keywords** Education · Endogeneity · Instrumental variables · Self-employment · Transitional countries

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## Introduction

What is the effect of university education in transitional countries on the likelihood of being self-employed? Do individuals with university education have higher or lower probability to be self-employed versus being wage-earners in these countries? Does such probability vary across transitional regions?

Answering these questions are important since developing free private entrepreneurship has been one of the most important features of transition from a centrally-planned economy to a market one (Nikolova et al. 2012). The success of economic transition is strongly associated with the level of entrepreneurship (McMullen 2011). New entrepreneurs can find a niche in businesses that did not exist before transition or were stagnant under centrally-planned systems (Berkowitz and DeJong 2011). New entrepreneurial enterprises are more efficient with sales, and employment increases faster in these enterprises compared to state-owned or privatized companies (McMillan and Christopher 2002). Private entrepreneurship provides an important protection against income shocks associated with transitional processes by providing an alternative source of income and employment (George et al. 2012). Consequently, McMillan and Woodruff (2002, p. 154) concluded, “the success or failure of a transition economy can be traced in large part to the performance of its entrepreneurs”.

Against this background that highlights the importance of the entrepreneurship, the objective of this paper is to assess the effect of higher education on probability of self-employment in a diverse sample of 29 post-communist transitional countries. To study the effect of education is important since it can directly be manipulated and influenced by policy measures (Heyneman 2010; van der Zwan et al. 2013). In general, human capital theory postulates the positive return of higher level of education for wage earners and self-employed, although no such theory has yet been developed for the effects of education on the choice of self-employment (Block et al. 2011). Empirical findings regarding the effect of higher education on self-employment are far from conclusive (Dickson et al. 2008; Grilo and Thurik 2005; Parker 2009). Some studies demonstrate that higher education allows for the attainment of skills and know-how valuable for self-employed (Davidsson and Honig 2003; Tamasy 2006; Klaesson and Larsson 2014). They have reported positive effects of education on the propensity of self-employment. Other studies demonstrate that higher education weakens start up intentions (Álvarez et al. 2013; Christelis and Fonseca 2015; Tamvada 2010; Uhlaner and Thurik 2004). They have reported negative effects of education on the propensity of being self-employed. Yet, other studies argue that education may lead to skills that are helpful for both self-employed and wage-earners, and therefore there is no straightforward association between high education and individuals' probability of being an entrepreneur or a wage-earner (Gimeno et al. 1997; Lee 1999).

Although there are a few studies, which focused on the determinants of entrepreneurial choice in transitional countries, the direct effect of high education on self-employment is under researched (van der Zwan et al. 2013). The one reason is the lack of reliable high-quality data that would allow studying the effects of education on self-employment on a diverse sample of transitional countries (Nikolova et al. 2012). The specificities of transitional economics, such as under-reformed educational systems, lack of trust in people and institutions, and economic and political instability suggest that the findings about the effect of education on self-employment choice made in more

developed established democracies may not be automatically apply to transitional countries (Anderson and Heyneman 2005; George et al. 2012).

To cover the gap in the current literature, this article has two main objectives. First, to analyze the effect of university education on probability of being self-employed using a large data set which cover a diverse set of 29 transitional countries. Second, to employ IV method to address endogeneity. Endogeneity arises due to omitted explanatory variables, which may potentially influence both educational attainment and choice of self-employment. For instance, potential omitted variables such as, ability, intelligence, and motivation might simultaneously affect probability of obtaining higher education and the choice of being self-employed (Bauer and Chytilová 2010; Block et al. 2012; Parker 2009). Ignoring endogeneity, which occurred by omitted variables, led to biased estimates even for large samples (Block et al. 2011; Masakure 2015).

## Conceptual framework

In this paper we hypothesize that university education has negative effect on probability of being self-employed in transitional countries. The specific hypothesis, which we test in this study, can be articulated as follows:

*Hypothesis 1: “University education has negative effect on probability of being self-employed in transitional countries”.*

The negative effect of university education on probability of being self-employed in transitional countries can be explained by two main reasons. First, transitional countries inherited an educational system that was especially tailored to produce a set of skills which were required for a centrally-planned economy (Habibov 2010; Sabirianova 2002; Silova et al. 2007). Such set might be inappropriate to the new labor market circumstances inasmuch as it does not provide confidence, knowledge, and know-how needed to set up and manage their own business. At the same time, negative attitude to self-employment could further be reinforced by university education in transitional countries, which traditionally has been focused on enabling students to secure stable jobs (Bilić et al. 2011).

Second, individuals with high education who invested time and efforts to get university education are reluctant to move to self-employment (Alexeev and Kaganovich 1998; Habibov 2012). Individuals with a university education may also better understand specific risks associated with establishing and operating self-owned enterprises in uncertain and unstable socio-economic and regulatory conditions of transitional countries.

Third, in transitional countries, individuals with high education have more taste for leisure than individuals without high education (Mussurov and Arabsheibani 2015). Consequently, individuals with high education may deliberately favor under-employment, for instance, by being employed in government bureaucracy.

In addition, the problem of establishing the effect of education on the probability of being self-employed in transitional countries goes beyond the lack of reliable data, as isolating the effect of higher education on probability of self-employment is difficult given the strong endogeneity (Van der Sluis et al. 2008). A few studies, which

addressed endogeneity in the effect of education on probability of self-employment in developed countries, have confirmed the importance of the omitted variable problem (Block et al. 2011, 2012; Parker and Van Praag 2006, 2010, Parker and van Praag 2010).

Perhaps due to endogeneity, the results of previous studies on the effect of education on self-employment in transitional countries produced inconclusive and contradictory results. Thus, Dutz et al. (2013), Karpinska et al. (2012) and Nikolova et al. (2012) have found that higher education in transitional countries is associated with higher probability of being self-employed. By contrast, Cho et al. (2015), Vakhitova and Coupe (2014), and Mussurov and Arabsheibani (2015) have found that higher education is associated with lower probability of being self-employed.

To the best of our knowledge there have been no studies on the effect of education on self-employment choice that addresses endogeneity in a diverse sample of transitional countries. In fact, we are only aware of one study by Block et al. (2011) that addresses endogeneity of education effect on self-employment in transitional countries. However, the authors covered only a handful of transitional countries, namely, the Czech Republic, Estonia, Latvia, Lithuania, and Hungary.

## Method

For this study, we use the life in transition country survey (henceforth, LITS) conducted by the European Bank for Reconstruction and Development and the World Bank (EBRD 2011) that included over 29 transitional countries in 2010.<sup>1</sup> The survey collects information about the work status, risk acceptance, trust in people and institutions, and educational attainments of respondent and their parents. Approximately 1000 household were interviewed in each country by specially-trained interviewers, with total sample size reaching 31,089 respondents.

In this study, we are interested in the effect of educational attainment on the choice of self-employment. Following the previous studies, we restricted our sample to those who worked for wage, as either self-employed or in paid employment during last 12 months at the time of interviewing, by excluding students, retirees, unemployed, respondents who refused to provide an answer, and missing answers (Block et al. 2011). This studies sample was reduced to 15,111 respondents.

The outcome variable for this study is a binary variable, self-employed, that captures whether the respondent is self-employed or not. If the respondent was self-employed, we assign 1 to the binary self-employed variable. The predictor variable for this study is university education.<sup>2</sup> A value of 1 is given if a respondent's highest level of educational attainment includes bachelor, master or Ph.D. degrees, and takes value of 0 if educational attainment is lower. We control for the socio-demographic variables of age and gender, which is commonly used for self-employment study (Grilo and Thurik 2008; Johansson 2000). We also

<sup>1</sup> The countries cover by the LITS include Albania, Armenia, Azerbaijan, Belarus, Bosnia, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Kosovo, Latvia, Lithuania, Macedonia, Montenegro, Moldova, Mongolia, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Ukraine, and Uzbekistan.

<sup>2</sup> The LITS does not provides education in years for the respondents.

control for general trust in people and institutions, and risk acceptance, as previous studies found that they are positively associated with probability of being self-employed (Andriani 2015; Cramer et al. 2002; Hamilton 2000; Nakhaie et al. 2009). Finally, we control for country fixed effects by including the dummy variables for  $r$  countries into regression models. The relationship between the outcome, the predictor, the control, and instrumental variables is illustrated by Fig. 1, while summary statistics is provided in Table 1.

Since our outcome variable is binomial we commence with estimation of standard binomial probit model. This model ignores endogeneity, and hence could be biased. To adjust for endogeneity, we use instrumental variable bivariate probit. In simplified form, the biprobit model can be presented in the following form:

$$Y^* = X\beta_y + D^*\alpha_y + \varepsilon \quad (1)$$

$$D^* = X\beta_d + Z\alpha_d + \varepsilon \quad (2)$$

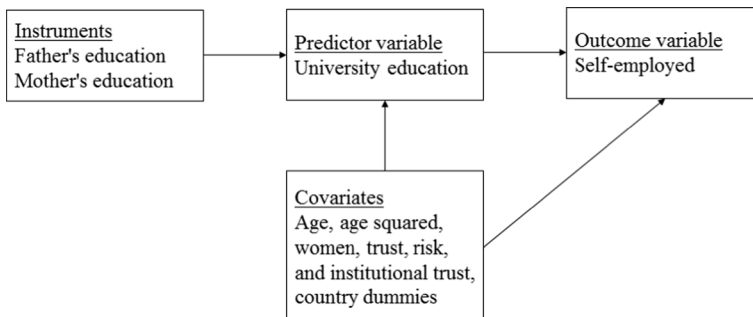
where both  $Y^*$  and  $D^*$  are latent variables that are not observable but depends on the observable outcome variable  $Y$  and predictor  $D$  respectively. The variable  $X$  is covariates, and is  $\alpha$  a vector of instruments,  $\beta_y$  and  $\beta_d$  are coefficients estimated using maximum likelihood method. The purpose of biprobit is to evaluate the following equation:

$$\text{Prob}(Y = 1) = \varphi(Y^*) \quad (3)$$

$$\text{Prob}(D = 1) = \varphi(D^*) \quad (4)$$

where  $\varphi(\cdot)$  is the cumulative distribution function of standard normal distribution.

The difficulty of using the instrumental variable approach for analysis is that instruments have to be correlated with the predictor variables, and at the same



**Fig. 1** Relationship between the outcome, the predictor, the instruments and the covariates

**Table 1** Summary statistics

Variable	Description	Mean	Prop.	St. err	Min.	Max.
Outcome variable						
Self-employed	Binary variable = 1 if respondent is self-employed		19.28 %	0.0032		
Predictor variable						
University education	Binary variable = 1 if respondent has a university degree		27.62 %	0.0036		
Covariates						
Age	Age of the respondent	40.21		12.62	17	99
Age squared	Age of the respondent square	1776.05		1091.02	289	9801
Women	Binary variable = 1 if respondent is a female		54.75 %	0.0040		
Trust	Trusting people index, higher the index is, higher chance to trust other people	3.00		1.02	1	5
Risk	Willingness to take risks index, higher the index is, higher the chance that respondent is willing to take risks	5.13		2.49	1	10
Institutional trust	Composite index of trust with respect to the country's central government, regional government, local government, parliament, political parties, court, and police. The index varies from 0 to 7, where 0 indicates the lowest trust and 7 denotes the greatest trust in institutions.	1.98		2.26	0	7
Instruments						
Father's education	Father's full-time education in years	10.21		3.94	0	50
Mother's education	Mother's full-time education in years	9.75		3.93	0	44

time the effect of the instruments on outcome variable have to be indirect, i.e. the effect of the instruments on the outcome variable has to be captured by the predictors (Axinn and Barber 2001; Winship and Morgan 1999). Following previous studies, the instruments are family background characteristics, namely the years of education of the father and mother (Ashenfelter and Zimmerman 1997; Lemke and Rischall 2003). Theoretically, it is well-established that on average higher education of parents is associated with higher education of children (Currie and Moretti 2003; Farré et al. 2012; Plug and Vijverberg 2003). Earlier studies, which used the instrumental variable approach showed that family education is highly correlated to education of parents (Blackburn and Neumark 1993; Masakure 2015; Parker and Van Praag 2006). Perhaps more importantly, the recent studies on the effect of education on occupational choice suggest that parent

education is a valid instrument for education (Block et al. 2011, 2012; Masakure 2015). Consequently, we hypothesize that parent education is a valid instrument for education of their children.

We empirically tested the validity of the instruments in several ways. First, to test whether the instruments are associated with the outcome variable, we calculated the Person's correlation between the instruments and outcome variable. The correlation for father's full-time education year is -0.11 ( $p = 0.000$ ) with the self-employed, while the correlation for mother's full-time education year with the self-employed is -0.13 ( $p = 0.000$ ). The correlations for the instruments with self-employed are considered to be negligible (Mukaka 2012), which suggests that instruments and outcome variable are not strongly associated.

Second, to test whether the instruments are not jointly correlated with the outcome variable, we estimated the Sargan and Basmann tests (Basmann 1960; Sargan 1958). Non-significant  $\chi^2$  for both tests, reported in Table 2, indicate that the instruments are not jointly correlated with the outcome variable.

To test whether instruments are correlated with the predictor, we conducted first-stage robust F-statistic test. A significant robust F statistics, which is higher than a rule of thumb value of 10, indicates that instruments are not weakly correlated with the predictor (Cameron and Trivedi 2010; Stock et al. 2002).

To test that the instruments are not weakly correlated to the predictor, we compute the minimum eigenvalue statistics and compared them to the Stock and Yogo's critical values. The minimum eigenvalue statistics values reported for all biprobit models are higher than Stock and Yogo's critical values, which indicate that instruments are not weakly correlated with the predictor (Cragg and Donald 1993). All the above-tests are estimated by running 2SLS. Although these tests were especially developed for nonlinear models, their estimation is important in the assessing the biprobit (Nichols 2007).

To assess whether the biprobit models are preferred over single-stage probit models, we performed Wald test of endogeneity for biprobit models. In all our estimations, significant results of the tests indicate that the results of single-stage probit model are biased, and biprobit model should be used instead (Knapp and Seaks 1998).

Probit and biprobit models are estimated using `-probit-` and `-biprobit-` commands in Stata 13 software package. Since some controls, such as general trust in people and institutions, and risk acceptance, can be correlated to each other we included them into regression hierarchically.

We commence with estimation of single-stage probit models for the total sample and then move to estimation of biprobit models total sample. To further explore the spatial variation in the effect of university education on self-employment we split sample into three groups in accordance with EBRD classification: (1) the former Soviet Union (FSU) region encompassing Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Ukraine, Uzbekistan and Mongolia, which was not officially part of the former Soviet Union; (2) the Southern Europe (SE) region encompassing Albania, Bosnia, Bulgaria, Croatia, Macedonia, Romania, Serbia, and Montenegro; (3) the Central Europe (CE) region including the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, and Kosovo.

**Table 2** Results of probit and biprobit models

	Probit			Biprobit		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
University education	-0.073*** (0.009)	-0.083*** (0.009)	-0.083*** (0.009)	-0.208*** (0.032)	-0.269*** (0.036)	-0.269*** (0.036)
Age	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
Age squared	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000* (0.000)	0.000 (0.000)	0.000 (0.000)
Women	-0.056*** (0.007)	-0.047*** (0.007)	-0.047*** (0.007)	-0.050*** (0.009)	-0.035*** (0.009)	-0.035*** (0.009)
Trust		0.002 (0.003)	0.002 (0.003)		0.007 (0.004)	0.007 (0.004)
Risk		0.015*** (0.002)	0.015*** (0.002)		0.019*** (0.002)	0.019*** (0.002)
Institutional trust			-0.001 (0.002)			0.001 (0.002)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,102	13,985	13,985	11,402	10,609	10,609
Wald $\chi^2$	1502.50***	1757.07***	1915.30***	15580.43***	18671.08***	19457.13***
First-stage regression summary statistics						
Robust F statistic				359.93***	316.70***	314.86***
Minimum eigenvalue statistic				491.96	426.61	426.9
Stock and Yogo's statistic				19.93	19.93	19.93
Tests of overidentifying restrictions						
Sargan $\chi^2$				1.26	1.93	1.91
Basmann $\chi^2$				1.25	1.92	1.91
Test of endogeneity						
Wald test of $\rho = 0$				16.74***	21.59***	21.75***

Note. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

## Results

### Total sample

The marginal effects of single-stage probit models, which ignore endogeneity, are reported in Model 1-3 in Table 2. Model 1 serves as our baseline estimation, and includes only respondent's education and socio-demographic control such as age, age squared, and gender. The model indicates that the university degree reduces the probability of self-employment by 7.3 % points. Being a women reduces probability of self-employment by 5.6 percentage points.



After controlling for trust in people and risk acceptance of respondent in Model 2, the negative effect of university education on the probability of self-employment increased to 8.3 percentage points. The increase in risk score is associated with higher probability to be self-employed, while trust in people is not significant. The effect of other covariates is the same as in the previous model.

Index of institutional trust is added in Model 3. The effect of institutional trust is not significant. The direction and the magnitude of the effect of the university degree on self-employment remain the same as in the previous model. The effects of other covariates are the same as in the previous model.

The marginal effects of biprobit models, which address endogeneity, are reported in Models 4–6. Model 4 serves as our benchmark model, which includes only respondent's education and socio-demographic controls such as, age, age squared, and gender. It indicates that the university degree leads to the reduction in propensity of being self-employed by 20.8 percentage points. After we control for trust in people and risk acceptance of respondent in Model 5, the negative effect of university education reaches approximately 26.9 percentage points. Adding institutional trust as a control in Model 6 did not change the direction and the magnitude of the effect of the university education.

To quantify the impact of endogeneity, we compare the results of the effect of university education suggested by probit with the results suggested by biprobit. As shown, the negative effect of university education in Models 6 is approximately 3.2 times higher than Model 3. The impact of endogeneity in our study is in line with that reported by previous studies. Thus, Masakure (2015) reported an approximate 4 times difference between single-stage and instrumental variable models, while Block et al. (2011) found about 10 times difference.

## Regional samples

The regional probit and biprobit results are reported in Table 3. The probit and biprobit models for the countries of the former Soviet Union are reported in Model 7 and 8. The results suggest that university education reduces the propensity of being self-employment by 10.2 and 33.4 percentage points in the FSU region. The probit and biprobit results of the Southern Europe region are reported in Model 9 and 10. The results suggest that a university education reduces the probability of being self-employment by 12.7 and 32.5 percentage points respectively. The results of probit and biprobit for the Central Europe region are reported in Model 11 and 12. They suggest that a university education reduces the probability of being self-employment by 2.3 and 5.4 percentage points. However, the reduction is not significant in both probit and biprobit.

In terms of difference between single-stage probit and biprobit results, we find that effect of education, which suggested by biprobit, is approximately 3 times higher than the effect suggested by probit in all regions under investigation.

## Conclusion

Despite the surge of empirical studies exploring the role of education in probability of being self-employed, limited evidence exists for post-communist transition countries

**Table 3** Results of probit and bipoibit models for regions

	FSU		SE		CE	
	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
University education	-0.102*** (0.013)	-0.334*** (0.058)	-0.127*** (0.019)	-0.325*** (0.053)	-0.023 (0.013)	-0.054 (0.072)
Age	0.001 (0.002)	0.003 (0.003)	-0.006* (0.003)	-0.006 (0.003)	-0.001 (0.002)	0.001 (0.002)
Age squared	-0.000 (0.000)	-0.000 (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)
Women	-0.050*** (0.010)	-0.036** (0.013)	-0.038* (0.016)	-0.025 (0.018)	-0.049*** (0.010)	-0.046*** (0.013)
Trust	0.002 (0.004)	0.006 (0.005)	0.002 (0.007)	0.009 (0.007)	0.002 (0.007)	0.001 (0.008)
Risk	0.013*** (0.002)	0.018*** (0.003)	0.014*** (0.003)	0.016*** (0.003)	0.020*** (0.002)	0.023*** (0.004)
Institutional trust	-0.000 (0.003)	0.000 (0.003)	0.001 (0.004)	0.004 (0.005)	-0.003 (0.002)	-0.002 (0.003)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
PSU fixed effect	No	No	No	No	No	No
Observations	5658	4251	3600	3168	4727	3190
Wald $\chi^2$	697.57***	5565.22***	338.95***	1404.95***	198.14***	365.85***
First-stage regression summary statistics						
Robust F statistic		99.11***		150.37***		65.79***
Minimum eigenvalue statistic		157.67		173.86		107.17
Stock and Yogo's statistic		19.93		19.93		19.93
Tests of overidentifying restrictions						
Sargan $\chi^2$		0.002		2.45		6.07*
Basmann $\chi^2$		0.002		2.43		6.05*
Test of endogeneity						
Wald test of $\rho = 0$		9.07**		14.15***		9.07**

Note. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

that also take into account the endogeneity issue. We used a high-quality data set that covers a diverse set of 29 transitional countries, to find the effect of education on probability of people being self-employed using standard probit models and instrumental variable bipoibit that address endogeneity. The findings presented in this paper allow us to draw three important implications.

First, from the theoretical perspective, our findings suggest a negative effect of university education on the propensity of being self-employed. This finding remains the same for single-stage model (i.e. binomial probit) and instrumental variable model (i.e. bipoibit). Furthermore, this finding remains the same for the total sample of transitional countries and for the former Soviet Union and the Southern Europe regions taken

separately. As outlined in the conceptual framework the negative effect of university education on probability to be self-employed could be explained by the interplay of three main factors. Educational system is not well-tailored to provide students with skills and confidence in setting up and managing their own business. At the same time, that individuals with higher education who invested in obtaining higher education are reluctant to be self-employed in uncertain socio-economic and regulatory environment of transitional countries. Likewise, higher education increases preference for more leisure. However, in the Central Europe, where most countries are members of the European Union or candidates for the European Union, the negative effect of university education is not significant. It seems that the above-mentioned factors which explain negative effect of university of education in the former Soviet Union and the Southern Europe have relatively weaker effect in the Central Europe since this region is the most developed with better education system, more stable socio-economic and regulatory environment, and less taste for under-employment through government employment.

Second, from the practical perspective, our findings suggest that more efforts should be made to foster entrepreneurship through university education in transitional countries. Fortunately, there are examples of successful cooperation in developing new curriculum and syllabi between universities in developed and transitional countries through the partnership projects (Heyneman 2005). Such examples could be instrumental in bringing entrepreneurship education in transitional countries in line with those in developed countries of the Western Europe and North America. More specifically, entrepreneurship can be incorporated into university education as a matter of culture, as a matter of behavior, or as a matter of specific situations (Fayolle and Klandt 2006). Education centered on fostering entrepreneurship as a matter of culture incorporates a set of values, beliefs and attitudes which are usually associated with entrepreneurship. Promoting entrepreneurial mindset and spirit exemplifies fostering entrepreneurship as a matter of culture. Education centered on fostering entrepreneurship as a matter of behavior typically focuses on developing a particular set of skills related to setting up and managing their own business. Skills related to making decision in uncertain situations is an example of such skills. Lastly, fostering entrepreneurship-oriented education involves business skills such as the creation of new firms and corporate venturing.

Third, from the method perspective, our study demonstrates the existence of strong endogeneity in the estimation of education effect on the propensity of being self-employed. Ignoring endogeneity renders estimations biased. Our empirical results show that the standard single-stage models that do not address endogeneity (e.g. standard binomial probit regression) should be used with caution when it comes to the estimation of the effect of education in transitional countries. Such standard models tend to underestimate the negative effect of the education on the probability of being self-employed in the countries of transition. The researchers should use alternative approaches to reduce endogeneity, such as instrumental variables and longitudinal analysis.

Finally, this study has several important limitations.<sup>3</sup> On the one hand, the negative relationship between high level of education and probability of being self-employed

<sup>3</sup> We are grateful to anonymous referees for pointing out to the alternative explanations of negative effect of education on self-employment.

could be explained by the motive, for instance, opportunity versus necessity as possible motives for taking the decision to be self-employed. On the other hand, it is possible that individuals with a more balanced portfolio of human capital, social capital and experiences rather than with university education are more disposed to be entrepreneurs (Lazear 2005). In addition, one can speculate that the negative image of entrepreneurship and type of education could be important explanatory factors (Boissin et al. 2009). Unfortunately, we cannot test the above-discussed alternative explanations due to the data set limitations. Thus, testing the alternative explanations constitutes the agenda for the future studies.

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